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THE PLANT DISEASE BULLETIN

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THE PLANT DISEASE SURVEY

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BUREAU OF PLANT INDUSTRY

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THE PLANT DISEASE BULLETIN

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THE PLANT DISEASE SURVEY

Vol. VI. July 1, 1922 Number 1

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WHEAT

THE FLAG SMUT SITUATION

During May and the first half of June a survey for flag smut has been conducted in parts of Illinois and Missouri. The United States Department of Agriculture, represented by the Plant Disease Survey; the Illinois State Department of Agriculture; the Illinois Natural History Survey; and the Missouri Agricultural Experiment Station, have all cooperated in this work. Over 1200 farms were examined in Madison, St. Clair, Monroe, Jersey, and Macoupin Counties, Illinois, and in St. Louis and St. Charles Counties, Missouri, and as a result flag smut was found on about 226 of them. Approximately 283 of the farms inspected were within the quarantined area of last year and of these 155, or 55%, were found to harbor flag smut. The disease is so difficult to detect, when in small quantities, that it is impossible to make a definite statement that it does not occur on any particular farm. Outside of the 1921 quarantined zone, flag smut was found on 71, or 8%, of the 900+ farms inspected.

Distribution

As a result of the survey the area of known infestation has been increased from 72 to about 700 square miles. The disease has been found in Missouri where apparently it has been present for a number of years, and in two new Illinois counties, Jersey and Monroe.

The accompanying map shows the range of the disease as determined this year. It is very unlikely that all the outposts of infection have been located yet, as the short time for observation did not permit thorough scouting on the extreme edges of the areas.

Losses.

In most of the infested fields the disease was present as a mere trace, only a few affected plants being found. In a small number of fields, however, an average of 2-3% was estimated and in limited areas in these and other fields as high as 30% flag smut was determined by actual count.

Dissemination of flag smut

The importance of the threshing machine in spreading flag smut spores was clearly brought out in the work of this year. An investigation of threshing circuits showed that when the disease was present on one farm it was very liable to be present also on others in the same circuit, especially those that were threshed either before or after the infested one. Instances of apparent transmittal by threshing outfits over considerable distances were found.

Numerous examples of dissemination of the organism by seed and by wind were also found. Evidence that surface water may be a factor in spread was obtained, but it seems improbable that flood water is of importance in this regard.

Wheat varieties

Within the quarantined areas of last year Red Wave and Turkey 10-110 were planted almost exclusively. The disease was all found in the Red Wave

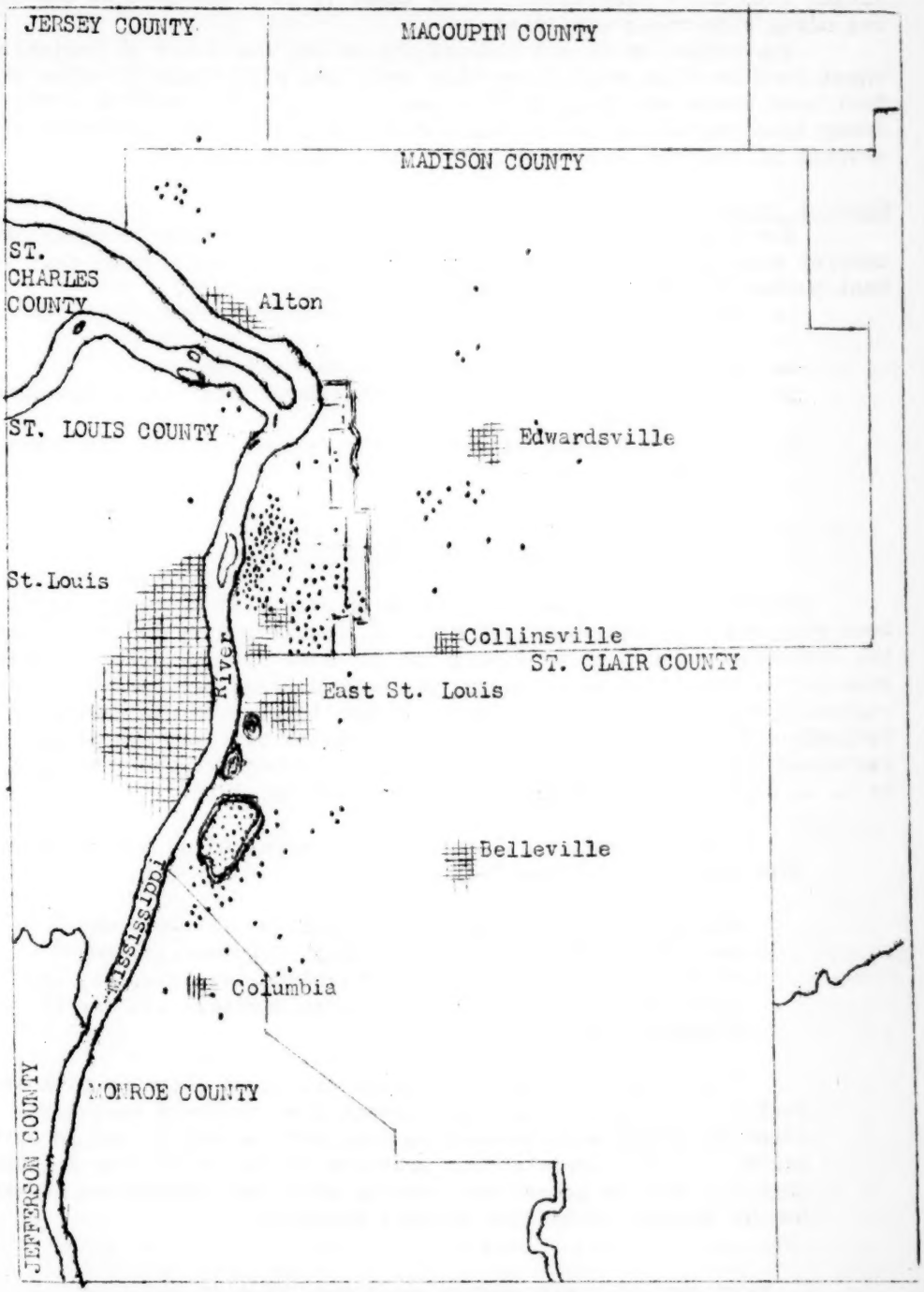

Fig. 1. Present known geographic distribution of flag smut of wheat.

fields with three exceptions and in these it is probable that the Turkey was mixed with other varieties.

The Office of Cereal Investigations now has about 18 varieties of wheat that have not showed any flag smut, and also about 39 other wheats that have shown less than 1% flag smut, during tests covering 2 and 3 years. Among these varieties are a considerable number of very desirable wheats and several of them are well adapted to the infested regions.

Control program

The quarantine program of the Illinois Department of Agriculture will consist this year in the following, although it is understood that requirement Number 1 given below is still under consideration.

1. The requirement that all wheat produced within the area be milled into flour.
2. The restriction of wheat straw to the area.
3. The requiring of threshing outfits to stay within the quarantined zone.
4. The recommending of resistant varieties and the disinfection of seed wheat.

THE STEM RUST SITUATION

No reports of serious occurrence of stem rust (Puccinia graminis) have been received from collaborators to date. Neither have the state leaders of the barberry eradication work reported any serious occurrence on wheat. They have been finding the stage on the barberry during April and May and are now reporting spread from these infected bushes to grasses and grains in the vicinity. The following statement giving dates of first appearance and information regarding spread of the rust from barberry bushes has been given by H. D. Barker (Cereal Courier 14: 125, June 10, 1922.).

"Reports indicate that stem rust appeared on the barberries this spring as follows:

Ohio.....	April 11	Colorado.....	May 8
Nebraska....	April 21	South Dakota.....	May 9
Wisconsin...	April 29	Michigan.....	May 15
Minnesota...	May 5	North Dakota.....	May 22
Illinois....	May 6		

"Wheat growing near barberries was found infected with stem rust in Ohio on May 26. Rust spread from barberry bushes was found on susceptible grasses in Minnesota on May 26 and in North Dakota May 28. Reports from southern states up to June 1 indicate that the rust on grains and grasses away from barberries is probably now no farther north than central Missouri."

LEAF RUST OF WHEAT SEVERE AGAIN THIS YEAR IN THE SOUTHERN AND EASTERN STATES

Heavy infections of leaf rust (Puccinia triticina) have been reported again this year. On a recent southern trip, W. H. Tisdale found the disease

to be the worst that it has been for a number of years at Clemson College, South Carolina, and Auburn, Alabama. From Tennessee, Sherbakoff reported June 3 that the disease was very severe, affecting nearly 100% of the total leaf area, and in South Central Pennsylvania, Kempton and Humphrey found the disease to be very abundant in some cases. From Kentucky, Valleau reported May 9 that on that date very little leaf rust was shown. However, at the present writing the disease is probably plentiful in that state.

The men engaged in the flag smut survey in the Illinois counties across the river from St. Louis, found leaf rust to be very abundant, practically the entire leaf surface, including the uppermost leaves, was affected. In walking through the fields the men's clothing would become red with rust spores. Undoubtedly the disease caused considerable shrivelling of the grain in this region. It is true that dry weather at the time the wheat was maturing undoubtedly influenced the yield, but it would by no means have had so great an effect if the leaf rust had been absent.

WHEAT SCAB REPORTED FROM MARYLAND, TENNESSEE, AND KENTUCKY

In a trip to Charles and St. Mary Counties in Southern Maryland near the end of June, R. A. Jehle found wheat scab caused by Gibberella saubinetii in all the fields examined and was apparently becoming abundant in most of them. The disease was also occurring on the experiment station farm at College Park, Maryland, June 12. It is probable that wet weather during the week of June 4-10 was responsible for the infection.

From Kentucky, Valleau reports June 23 that scab is prevalent on wheat in all sections of the state, but losses probably average less than 1% at this time. Sherbakoff in Tennessee reported observing some scab in wheat on June 3, but no recent reports concerning this disease in that state have been received.

SEPTORIA GLUME BLOTCH

This disease caused by Septoria glumarum was found by Jehle to be abundant in fields in Southern Maryland, June 10. Wheat heads were so heavily infected that they appeared brown from a distance. Undoubtedly the disease is causing some loss, according to Jehle.

The disease has been reported to the Survey also by Sherbakoff in Tennessee and by W. H. Tisdale from Davis, California.

TAKE ALL IN NEW YORK AND SOME RESULTS OF RECENT EXPERIMENTS

The only report of the true take-all caused by Ophiobolus cariceti (O. graminis) occurring in the field thus far this season comes from New York where it is being found in a considerable number of fields in territory determined as infested last year.

R. S. Kirby (N. Y. Sta. Col. Agr. Dept. Pl. Path. and Ent. Weekly News Letter, May 29, 1922) reported the appearance of the disease in his experimental plot at Ithaca as follows:

"Symptoms of take-all started to appear on winter wheat in the test plot at Ithaca on about May 22. These symptoms consist in: The

arresting of the growth on the plants when they are from 6 to 10 inches high (soon after jointing); the plants become chlorotic and finally die. In the meantime bits of plate mycelium appear on the culm under the leaf sheath. Since the disease showed up in a part of the plot where soil and straw from a diseased field had been added, there is every reason to believe that the disease would appear at the same time and under similar conditions in the field."

H. H. McKinney working in the greenhouse with a pure culture of the fungus from Oregon, reported the following interesting results on infection and its relation to soil temperatures. (Cereal Courier 14: 22-25. Feb. 28, 1922.)

"With the assistance of Mr. R. J. Davis, graduate student in plant pathology, a preliminary soil-temperature experiment with Ophiobolus graminis has been carried on in the 'Wisconsin tanks'. Soil was inoculated with pure cultures of the organism grown from a single ascospore isolated from a diseased wheat plant collected near Corvallis, Oregon. This experiment shows that at favorable soil temperatures, the parasite produces a severe seedling blight and often kills the plant within 14 days after sowing. The greatest injury occurred in soil held at temperatures near 22° and 24° C. The characteristic blackening of the base of the seedling and the 'plate' of the mycelium are strikingly evident. Badly infected seedlings turn yellow just below the tip of the leaves and gradually the whole plant turns yellow and then a bronze color. Severe root rotting also takes place at favorable temperatures.

"The seedling blight symptoms produced by Ophiobolus graminis are strikingly different from those produced by Helminthosporium sativum and Gibberella saubinetii as well as from the first symptoms of false take-all."

WHEAT ROSETTE IN ILLINOIS

This disease (so-called take-all) was found in Madison County, Illinois this year only in experimental fields. It was reported, however, from Mason and Fulton Counties of that state by County Agent T. R. Isaacs (Mason County) who wrote G. H. Dungan at Urbana as follows:

"Relative to the take-all in this county, I sent out a card to all of our members on this side of the county recently, asking them what variety of wheat they grew, and whether or not they had any disease. As a result of this survey I have found the following: No one having Turkey wheat had the disease. No one having Red Wave wheat had the disease. One man having Salzer and Fultz wheat reported the disease; only the one man reported this variety of wheat. All but two men, who had Red Cross, reported having the disease.

"The take-all has been quite prevalent on this side of the county this year and is really serious in the bottom lands of Fulton County.

"I do not think scarcely any Red Cross wheat will be grown this fall, as a result of this survey."

The foot rot reported from Kansas last year began to appear again this season about May 10, according to a letter from L. E. Melchers.

A summary of the Kansas foot rot situation, showing that the disease is unlike either the true take-all or the rosette that occurs in Illinois, and also indicating that both Helminthosporium sativum and Wojnowicia graminis may be involved, has recently been given by H. H. McKinney (Cereal Courier 14: 113-114. May 31, 1922 (mimeographed).

Several cases of foot rot with the wheat dying in spots, were investigated by C. D. Sherbakoff, May 30 - June 1 in parts of Unicoi, Green, and Cooke Counties, Tennessee.

RYE

LOOSE SMUT CAUSED BY USTILAGO SP. REPORTED FROM ILLINOIS

Several specimens of this rather scarce smut were collected in the early part of May by men engaged in the survey for flag smut of wheat in Madison County, Illinois. The specimens were found occurring singly for the most part and in widely separated fields. So far as is known these are the first collections of this disease in the state.

ALFALFA

ALFALFA ANTHRACNOSE SERIOUS IN ARKANSAS AND MISSISSIPPI

Anthracnose of alfalfa, caused by Colletotrichum trifolii Bain, has been reported as destructive again this year in parts of Mississippi and Arkansas. In 1921 it was reported to the Survey only from these two states, but in each of them it did great damage through successive girdling of the shoots with resultant starvation and rotting of roots. In that year whole fields were plowed up and very little hay was cut in the badly affected regions. Regarding its occurrence this year the following statements have been received from collaborators:

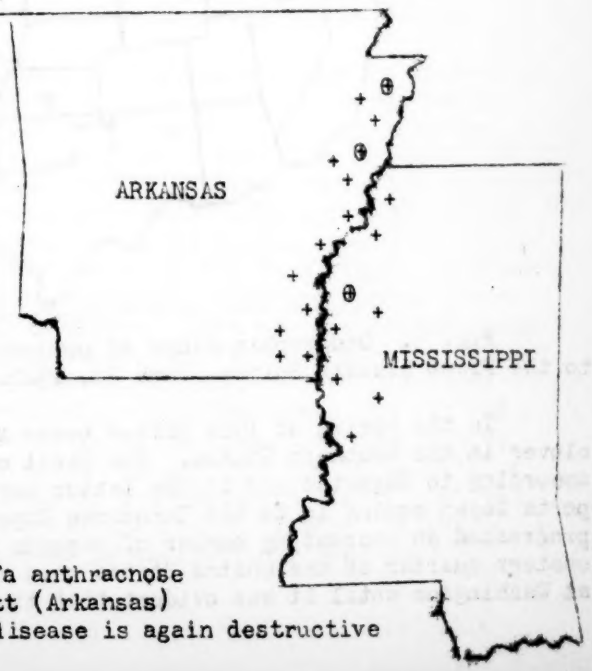

Fig. 2. Occurrence of alfalfa anthracnose in 1921 as reported by J. A. Elliott (Arkansas) and D. C. Neal (Mississippi). The disease is again destructive in this region this year.

Mississippi: This disease is perhaps the most important forage crop trouble in the Mississippi Delta. One planter in Bolivar County plowed up 1000 acres of alfalfa last season because of the extreme prevalence of anthracnose. It was also reported a number of times last year as well as this season in Washington, Leflore, Coahoma, Tunica, Yazoo, and Warren Counties as widely prevalent and causing the growers a considerable amount of alarm. (Neal, June 7).

Arkansas: Severe in some sections of eastern Arkansas this spring. (Elliott, June 23).

RED CLOVER

THE RED CLOVER POWDERY MILDEW EPIPHYTOTIC

In 1921 powdery mildew, apparently Erysiphe polygoni, appeared on the later crops of red clover in a considerable number of eastern states. It excited considerable comment among pathologists as it was very conspicuous, it occurred generally on red clover and heretofore it seems to have been only of rare occurrence. In fact the disease was entirely new to many people, numerous pathologists and agronomists making the statement that this was the first time it had ever come to their attention.

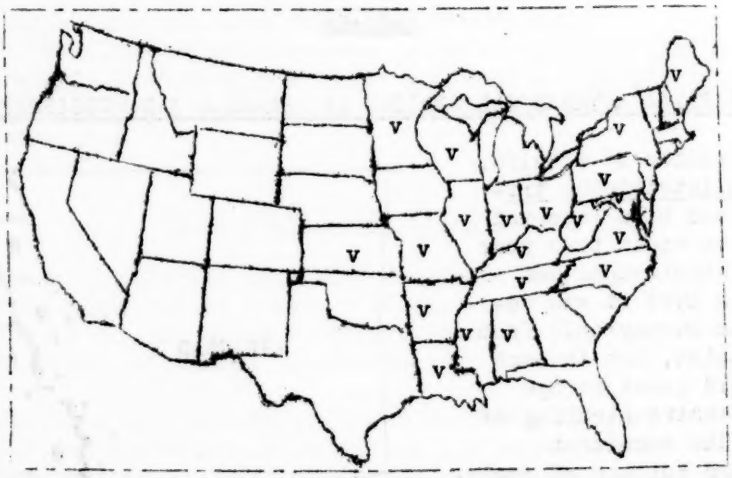

Fig. 3. Geographic range of powdery mildew or red clover as reported to the Plant Disease Survey, June 28, 1922.

In the spring of 1922 mildew began to be reported on the first crop of clover in the Southern States. The first complaint in Louisiana was April 10 according to Edgerton and in the latter part of that month and early May reports began coming in to the Tennessee Experiment Station. As the season progressed an increasing number of reports from collaborators in the southeastern quarter of the United States were received by the Plant Disease Survey at Washington until it was evident that the epidemic extended over the greater

portion of the East being most severe in the South and diminishing northward. At the present time, the disease does not seem to have attracted much attention in the North Atlantic or New England states, but specimens have been received from Maine and it is quite probable that as the season advances the disease will become more prominent in that section of the country.

In the regions most affected there seems to be little doubt but that the mildew has actually cut the yield to some extent by retarding growth and by causing death or shattering of leaves, particularly the lower ones.

The cause of the greatest concern on the part of farmers is the question of whether or not there is any danger of stock poisoning from feeding mildewed clover hay or from permitting animals to graze in affected fields. It seems very unlikely that the fungus would cause any ill effects but experimental proof is scarce. However, no cases of injury have been reported this year and furthermore the Tennessee Experiment Station has just completed a 14-day preliminary feeding and grazing experiment using horses, cattle, sheep, and swine, none of which showed any ill effects whatever. Some pathologists are recommending wetting the hay in case it is very dusty on account of the fungous spores. This would seem particularly desirable in the case of horses showing symptoms of heaves.

The name of this mildew is not known definitely, for as yet the perithecial stage of the fungus does not seem to have been found. Efforts should be made to discover the perfect stage this year and thus to settle the question of nomenclature.

This seems to be particularly a disease of red clover and its closely related form, the mammoth or sapling clover. However, crimson clover is reported affected in Louisiana and in Pennsylvania alsike was observed with mildew, although this does not seem to have been the experience in other places. There seems to be considerable variation in the susceptibility of different strains of red clover according to observations of a number of different persons. At the U. S. Department of Agriculture farms at Arlington, Virginia, A. J. Pieters observed that many of the American varieties of red clover were affected while most of the European strains were free.

More detailed reports by state collaborators and others follow:

All States: Regarding the occurrence of powdery mildew on clover, I find that we have 19 reports of occurrence - 15 supported by specimens; of these 5 were from Tennessee, 4 from Virginia, 3 each from Kentucky and Missouri, and 2 each from Maryland and Indiana. One correspondent from Wilmington, Virginia, reported that while red and mammoth clover were badly attacked, alsike clover and alfalfa were free. He also stated that the disease occurred in the entire county east of the Blue Ridge. Another correspondent at Cumberland, Maryland, reported alsike clover in the same field free from mildew. Most correspondents spoke of the disease being very general, one from Missouri reporting it 'on all clover in the community', another from Tennessee 'on clover generally', and another from Tennessee 'on all red clover, never seen before'. As to the amount of damage done, one correspondent from Virginia states that the 'crop will be practically a failure'; another from Kentucky stated that the disease had killed all the leaves. (W. W. Gilbert, Office of Cotton and Truck Crop Disease Investigations, June 29.)

New York: I have noticed considerable powdery mildew on clover. It is very common over the entire county but is more particularly severe outside of the lake plain. (Palmer, Field Assistant, Chautauqua County, June 26.).

Pennsylvania: Powdery mildew on clover has been reported this season from all over the state and is apparently unusually severe. Have seen specimens on mammoth clover, red clover, and alsike clover. (Thurston, June 27).

Maryland: I have seen mildews frequently in other clovers and various legumes (common or Japan clover), but this is peculiar in its abundance and being practically confined to red clover. Several samples and reports of its abundance have been sent us. It is apparently doing considerable injury. (J. B. S. Norton, June 13).

Virginia: The powdery mildew of clover is very prevalent and destructive in Virginia this year. The accompanying map shows the distribution as we know it to date, which indicates that it is expecially prevalent in the counties lying east of the Blue Ridge. We have had a great many letters from farmers amd most of them ask as to the use of hay made from such crops. We have no definite information on this point. The injury appears to be particularly severe on red clover but sapling clover (mammoth) is also affected. I think there is no question but that the mildew is doing a great deal of damage and that the death of the lower leaves is due directly to the attack of the mildew. The injury has been especially severe on the first cutting and we have been advising farmers to harvest the crop early in the hopes that the second cutting may escape severe injury. Such reports that we have to date indicate that the second cutting is not seriously affected as yet. (Fromme, June 13).

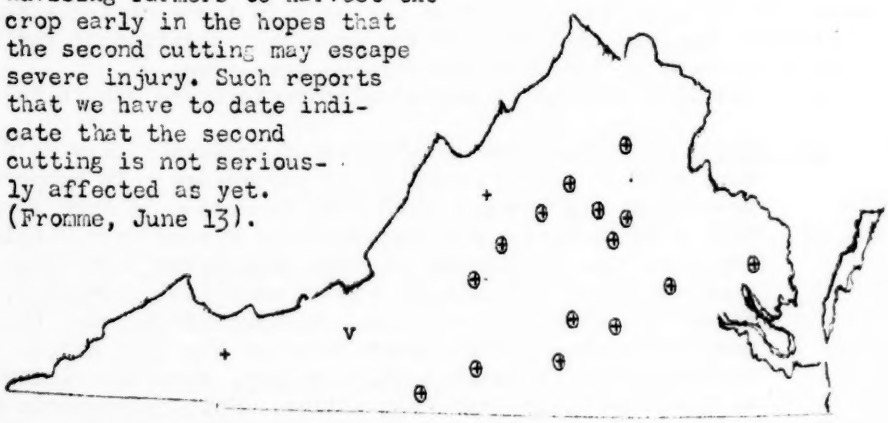

Fig. 4. Occurrence of powdery mildew on red clover in Virginia in 1922. First report May 11.

West Virginia: The powdery mildew has been extremely prevalent in all sections of West Virginia. It has been reported by people who feared that it might cause trouble to stock, and by others who were merely interested to know what it was. The powdery mildew of roses, apple, and red clover is more abundant this year than we have ever seen them. I know of no evidence that the red clover diseased with powdery mildew would cause injury to stock.

I am recommending that they take particular care in curing the hay before storing it. (Giddings, June 19).

Heretofore I have observed it on an occasional plant, mostly volunteer. This year it is generally abundant in and about Morgantown and reminds me of what I saw last autumn in eastern Connecticut. (Sheldon).

Kentucky: Powdery mildew of clover is being reported as a new disease by farmers from practically every section of Kentucky. In one case reported, cattle have refused to eat such clover but we have no other reports of this kind. It is difficult to say whether there is much loss due to it or not. Probably the actual yield of hay will be slightly reduced, although there may be some loss by stock refusing to eat the clover. (Valleau, May 31).

Clover mildew is being reported from all sections of the state as a new disease. It is questionable whether or not it is causing serious damage. (Valleau, June 23).

Tennessee: We have had a disease of clover called to our attention several times this year. It is powdery mildew, but so far we have seen no perithecia and hence are experiencing difficulty in determining same. Professor Essary says that he does not recall ever having seen the disease on clover before. In some cases it has evidently caused a good deal of damage. It seems to be general at least in East Tennessee, and I imagine it is also abundant in Middle Tennessee. (Hesler, May 9).

General and often severe. Tests recently made at the Experiment Station indicate that stock not injured when fed mildewed hay. Not observed on any but red clover thus far. No perithecia observed to date. (Hesler, June 23).

South Carolina: Red clover is not grown very extensively in this state and we have had no inquiries from farmers concerning injury of this crop by powdery mildew. I have noted it, however, a number of times on volunteer crops in various places. (Ludwig, June 15).

Mississippi: Powdery mildew is very prevalent in Mississippi this season. In fact, I have not been able to find a single patch of clover but what is not entirely covered by this disease. Isolated patches of red clover everywhere appear to have this mildew. At present, we have not had any complaint from farmers concerning any bad results when mildewed clover has been fed to stock. This may be due to the fact that not so much red clover is used for forage purposes in Mississippi as is the case with states further north. (Neal, June 16).

Louisiana: The disease has been extremely common this season in Louisiana on red and crimson clover. I am enclosing you a clipping from the Louisiana State University Press Bulletin of last week which describes the situation in this state. The first complaint was on April 10 and the disease is still very prevalent on what clover still remains in the field. (Edgerton, June 12).

"Louisiana clovers attacked by mildew. During the present season, there has been a serious epidemic of mildew on red and

crimson clover in Louisiana. Numerous complaints have come from the southern part of the state from Alexandria to the Gulf. The disease is very conspicuous in a field as the leaves turn white from the mildew growth on them. In some fields the disease has been so severe that the plants looked as if they had been heavily dusted with flour. This disease spreads very rapidly in a field when the moisture and temperature conditions are right. 'This is the first year that there has been any complaint from this disease,' says C. W. Edgerton, plant pathologist, experiment stations, Louisiana State University. 'Whether the trouble will stay with us and be a menace to the clover industry cannot be said at present. It may be that the present season has been very favorable for the disease, and if this is the case, it will possibly be of only minor importance another season. It is also possible that the disease is just gaining a foothold in the state and will be important every season.

'The mildew reduces the tonnage of the clover crop and will cause the hay to be slightly off color and of poorer quality. The affected leaves will not make as high quality of hay that healthy leaves will. Many of the affected leaves also die and become lost and the hay will show a higher percentage of stems. The disease, however, does not ruin the crop for hay. No poison or injurious substance is formed that would make the hay unfit for feed.'" (Louisiana State University Press Bulletin, June 8).

Arkansas: Powdery mildew of clover has been unusually severe in Arkansas this year, and has occasioned considerable loss to the clover crop. Farmers speak of its causing the clover to shatter and powder badly. We have received numerous inquiries as to its effect on stock, but have not received any information indicating that it had actually caused harmful effects. (Elliott, June 17).

Indiana: Mildew has been extremely abundant on red clover throughout the southern third of the state. Practically every field in the section of the state was white with mildew and we received a large number of inquiries as to whether or not it would damage the hay and whether or not hay would be poisonous to livestock. We have not seen any perithecia though we have made no special effort to find them. We sent out a news item sometime ago, saying that we could obtain no evidence that this mildew would be detrimental to stock grazing in the fields, or eating the cured hay. In cases where there seems to be any evidence that the foliage was being seriously injured by the mildew, we have advised early cutting. (Jackson, June 16).

Illinois: Mildew of clover has been reported to us from the following counties in Illinois: Calhoun, Champaign, Franklin, Gallatin, Greene, Jackson, Jefferson, Johnson, Macoupin, Marion, Massac, Monroe, Perry, Pike, Randolph, Richland, Saline, and White. The location of these counties indicates that the disease is well distributed throughout the southern half of the state. Heavy mildewing giving the fields the appearance of having been sprinkled with lime dust is common. Concerning the possible injury to livestock, I wish to quote from Farm Adviser C. M. McWilliams, Randolph County,

in his letter under date of May 29 says, 'My opinion is that it is not at all serious, because I have seen cattle pasturing on the clover and horses and mules that were fed on the young, newly cut, green clover and none of them are showing any bad effects whatever."(Dungan, June 13).

I spent three days among the farmers in St. Clair and Madison Counties, where this disease is unusually prevalent. I had a chance to talk to practically every farmer in that region so that I have some idea of their notions in regard to the trouble. The disease is so bad in that section that when the mower goes through the field a white cloud arises on all sides. In handling the hay, spores appear in clouds as though the plants were covered with dust. The fields look as though they had been sprinkled with flour or limestone dust. Red clover only is affected. In patches of white clover, sweet clover, alfalfa, and the little yellow clover which I believe is called hop clover, only the red clover shows any of the mildew. The farmers in that region are much alarmed concerning the trouble, especially what effect it will have upon the stock; also the effect it will have on the young clover which is now growing in the wheat. Those who handle the dried hay complain that the dust results in a stinging sensation in the nose and throat. ..... I heard no complaints as to the effect it had on the stock after they had eaten the affected plants. I assured the farmers that there would probably be no serious results provided the hay was allowed to cure thoroughly before being fed. I found no one who had fed the clover, since it was just being cut at the time, and of course it is a practice there as elsewhere not to feed freshly cut hay at this time of year. I found no evidence that the plants were being injured to any great extent. There was an especially fine growth of clover in that region due to the continued wet weather during the spring months. Of course, this also gave a chance for the development of mildew. (Anderson, June 12).

The clover mildew is abundant throughout Illinois and the conditions described in your special memorandum apply equally well in Illinois. It is especially notable that this season the epidemic has occurred on the first crop. We have heard that a disease or trouble similar to 'heaves' has occurred in the southern part of Illinois from the feeding of mildewed clover to stock. We have advised that some care should be used in feeding the hay until it became evident that the stock would not suffer. We have also advised the wetting of the hay before feeding in order to do away with dustiness. We find that the mildew, while widespread within the state, seems to be much more abundant southward, but there seems to be very little effect in the way of crop damage or interference with the proper curing of the hay. (Tehon, June 22).

Minnesota: We are finding this disease in epidemic form in Minnesota also. Within the past week, a ten acre field in Dakota County was found, in which 60 to 75% of the leaves were infected with mildew. A similar field also was found in Rice County about the same time. In both cases it was the first crop that was affected, and the disease does not seem to be doing very much damage to the plants. We have also found infected plants of red clover growing wild around the University within the past week. (Louise Dosdall, June 14).

Missouri: We are having an epidemic here of powdery mildew of clover on Trifolium pratense, and as the clover is being cut at the present time I am receiving a large number of inquiries as to whether the hay with this mildew on it is injurious to stock. (Hopkins, June 3).

Kansas: Mr. Dillenback, County Agent of Doniphan County, has just sent in some red clover covered with powdery mildew. He states that the whole field is similar to the specimen which he sent us and from that I judge it is a severe case of the mildew. I have looked at clover around Manhattan, but have been unable to notice any mildew. However, they surely have an epidemic in Doniphan County, but as yet I have been unable to find any perithecia of the fungus. (R. P. White, June 17).

APPLE

APPLE SCAB PLENTIFUL THIS YEAR

The reports on apple scab (Venturia inaequalis) received to date indicate that the disease is prevalent, perhaps unusually so in some sections. Collaborators report as follows:

Connecticut: Despite weather conditions that early did not seem to favor this trouble it has developed to a serious extent even on dusted and sprayed trees of the very susceptible varieties. (Clinton, June 23).

New York: Apple scab is prevalent everywhere but no unusual epidemics have been reported. (Chupp, June 23).

Pennsylvania: Unusually severe in Pennsylvania this year. Epiphytotic throughout the state. Defoliation taking place in many orchards. The apples also falling off due to early infection of scab on the petioles. Greatest damage of course in unsprayed or improperly sprayed orchards. (Thurston, June 27).

Maryland: This is the third successive season that apple scab has been bad. Prior to 1919 this disease did not seem to cause a very great loss in Maryland. It was always present but only to a slight degree, except an occasional local outbreak. (Temple, June 22).

West Virginia: Scab was reported May 4 and is quite prevalent in unsprayed orchards upon susceptible varieties. (Giddings, May 27).

Tennessee: Very abundant everywhere this spring. Wet weather and failure to apply "pink" spray seems to explain this condition. Scab continued to affect fruit chiefly; leaves not heavily affected except at higher altitudes. One commercial orchard shows almost certain loss of 75%. Especially bad on Mammoth, Black Twig, Winesap, and Delicious. (Hesler, June 23).

Arkansas: Severe on unsprayed fruit. (Elliott), June 23.

Illinois: Apple scab is causing unusual trouble this year. Both apple scab and apple blotch have been very successfully controlled by the standard sprays applied according to our spray schedule so there is no reason to believe that our schedules will not hold the diseases in check. (Anderson, June 12).

POWDERY MILDEW OF APPLE MORE ABUNDANT IN EAST THIS YEAR

Many reports of the occurrence of powdery mildew (Podosphaera leucotricha) have been received in New York, and in West Virginia the mildew is assuming epidemic form. Regarding its occurrence in the latter state, Giddings and Sheldon report as follows:

"Apple mildew was first noted April 8, and everything indicated more serious injury from this disease than has ever been noted previously. The disease was quite bad in the southern part of the state and is also being reported or sent in from practically every section."(Giddings May 27).

"Very abundant on a few trees near Morgantown. One tree in a pasture was covered so completely that the leaves had a silvery luster and were much curled and crinkled. This is the first time I have seen so much on large trees. The effect and appearance seems to be somewhat different from that usually occurring in nurseries. I shall try to secure perithecia." (Sheldon).

FROG-EYE LEAF SPOT WELL STARTED

Leaf spot caused by Physalospora cydoniae is reported as prevalent in Connecticut, New York, West Virginia, and Tennessee.

APPLE BLOTCH REPORTED FROM TENNESSEE, ARKANSAS, ILLINOIS, AND NEBRASKA

The following reports on apple blotch have been received from collaborators:

Tennessee: In epiphytotic form again this year. "Two-weeks" spray not properly timed. Oldenburg, Early Harvest, and Ben Davis worst affected; Yellow Transparent less. (Hesler, June 23).

Arkansas: Very severe on unsprayed fruit, especially in central Arkansas. (Elliott, June 23).

Illinois: Apple blotch appeared about two weeks ago in the southern part of the state and today it seems to be quite prevalent. (Anderson, June 12).

Nebraska: Blotch appeared very early and is abundant. (Goss, June 26).

WEATHER CONDITIONS FAVOR APPLE RUST

The following reports indicate a heavy infection of apple rust (Gymnosporangium juniperi-virginianae) this year:

New York: Apple rust seems to be more prevalent in the Hudson Valley than during the average year. (Chupp, June 23).

Maryland: This disease is showing abundantly in Maryland and many samples of it are being sent to State College for determination. It would seem that the disease may be unusually abundant this year from preliminary observations. (Jehle, June 12).

West Virginia: Apple rust appeared on May 6 and everything indicated an extremely severe infection upon susceptible varieties in localities where there are many cedars. (Giddings, May 27).

Tennessee: May 17: Pycnia present; no aecia. June 23: No aecia yet. Yates resistant. Disease general on leaves. (Hesler, June 23).

Arkansas: Very severe where cedars have not been cut. Most cedars have been removed from the commercial district. (Elliott, June 23).

PEAR

FIRE BLIGHT OF PEAR AND APPLE BAD THIS YEAR

New York, Delaware, West Virginia, and Kentucky report fire blight on both pears and apples as general and more common than usual; Tennessee as general and severe, as it normally is in that state, and Arkansas and Illinois as causing serious losses locally. In Delaware the disease was first observed in May and became prevalent since the rains at the beginning of June. There has been a severe epidemic of blossom and twig blight of apple throughout Kentucky, according to Valleau. West of the mountains in West Virginia twig blight caused a large amount of damage to apples, but it was probably not so important on the east side. The twig blight is most conspicuous on both hosts in Tennessee, but blossom blight of pear and leaf infection of apple are also common. In Arkansas the disease is severe on apples only near pear trees. Twig blight and fruit rot are severe in some localities, while other sections of the state have no blight at all, according to Anderson in Illinois.

On June 14, W. J. Morse of Maine reported as follows: "We recently received the second lot of specimens showing very characteristic fire-blight on apples since I came to Maine 16 years ago this summer."

W. S. Fields reported a very severe and disastrous outbreak of pear blight in the Sacramento Valley of California. Regarding it he gives the following: "I am told on fairly reliable authority that the damage (to the fruit) in some orchards will run as high as 60%. I understand that the outbreak has occurred within the past ten days and that many of the growers are working day and night in their efforts to cut out the blight in the trees, hoping to check the disease. The blight breaking out this late in the season (June 24) is very unusual, although the season has been backward and that partially accounts for it."

PEACH

LEAF CURL OF PEACH HAS BEEN COMMON

New York, Tennessee, and Arkansas report leaf curl (Exoascus deformans) as more severe than usual, and in Maryland and Illinois it is said to be bad in unsprayed or improperly sprayed orchards. It is prevalent in Delaware also, according to Adams. The disease was reported from the vicinity of Morgantown, West Virginia, by John L. Sheldon, and from Los Angeles, California by W. H. Tisdale.

BROWN ROT OF PEACH

Brown rot blossom and twig blight, caused by Sclerotinia cinerea, are reported from New York, Tennessee, South Carolina, and Illinois. Fruit rot is also being reported. Mature apothecia were first found in Delaware on April 10, and fruit infection on June 7. In Tennessee the blossom blight is said to be apparently not so severe as usual, but in Illinois the opposite seems to be true.

The following note by P. D. Rupert, a special field assistant of the New York State College of Agriculture, is of interest:

> New York (Wayne County): Brown rot infections are showing up in both cherries and peaches. The infections on the cherries have come from the mummied fruits hanging on the tree. These have been alive with spores. Infection in the peaches, however, has apparently come through the tiny canker on the limb at the base of a bud. The mycelium in this canker has grown up and killed the young growing bud and leaves and then spored from these. This infection is later than that on the cherries. No sporing mummies or perfect stage could be found on or around the peach trees. (P. D. Rupert, May 29).

CHERRY

BROWN ROT REPORTED FROM NEW YORK AND DELAWARE

New York reports infection of the blossom pedicels of cherries with the brown rot fungus (Sclerotinia cinerea) as more general and severe than usual; and in Delaware the disease is said to be very prevalent on sweet cherries.

GRAPE

REPORTS OF DOWNY MILDEW AND BLACK ROT

Downy mildew caused by Plasmopara viticola is reported from New York and from Tennessee, but is apparently not important except in the latter state at higher altitudes where both leaf and fruit infections are abundant.

Black rot caused by Guignardia bidwellii is reported from South Carolina and Arkansas as follows:

South Carolina: Disease severe in one vineyard in northwest corner of the state in spite of careful spraying schedule. Care was poor last year, however, thus furnishing an abundance of infective material. (Ludwig, Early in June).

Arkansas: Very severe on wild grapes and unsprayed cultivated grapes. Leaves, blossom clusters, and canes attacked. (Elliott, June 23).

STRAWBERRY

AN UNDETERMINED ROOT ROT OF STRAWBERRY SEVERE IN NEW YORK AND KENTUCKY

Root rots of unknown cause are reported by Chupp and Valleau from New York and Kentucky respectively.

New York: The root rot of strawberries has been reported already from six counties, and in a few plantings has resulted in almost a total loss of the crop. Isolations are being made to determine the fungus involved. (Chupp, June 23).

Kentucky: Root rot of strawberries caused practically complete loss of crop near Nicholasville. The plants grew vigorously, but at blossoming time the fruits failed to develop. The entire root system was found to be decayed, with the exception of a few new roots recently developed from the crown. (Valleau, June 23).

CITRUS

OUTBREAK OF CITRUS CANKER IN FLORIDA

The following note taken from the U. S. Dept. Agr. Official Record 1: 3. June 7, 1922, gives information concerning the recent outbreak of citrus canker:

"An outbreak of citrus canker, the much dreaded bacterial disease of orange and grapefruit groves, was discovered May 20 in a grapefruit orchard in an isolated section near Davie, Florida. As soon as specimens of the infected leaves were received at Gainesville, the State Plant Board force and department co-operators were sent to the spot and arrangements made for destroying the diseased grove. A corps of 25 experienced canker men were sent by the Florida Plant Board, with equipment for uprooting and burning all the infected trees. The trees are large and must be pulled out by tractors. Infection has been found on eight properties in the locality. The source of the present outbreak has not yet been determined."

CITRUS CANKER PREVALENT IN LOUISIANA

C. W. Edgerton in Louisiana reports citrus canker as being more prevalent than usual this season and spreading rapidly with little eradication work being done.

POTATO

LATE BLIGHT REPORTED FROM TENNESSEE

In March, according to A. C. Foster, late blight (Phytophthora infestans) was very prevalent and destructive, especially on the earlier potatoes, in the Sanford section of Florida.

C. D. Sherbakoff reports late blight from Fishery, Tennessee (June 3) where it was very severe on a field of volunteer potatoes, while very little was found in other fields, some of which were sprayed and some not. The volunteer potatoes, however, were at least several weeks older than the others Some severe cases of late blight were observed at Knoxville, also. This report is of peculiar interest as this disease has not been reported very frequently from Tennessee.

Collaborators are asked to be on the watch for this disease and to report at once any occurrences.

BLACKLEG OF POTATO

Blackleg was reported in February, by A. C. Foster, as causing considerable damage in a field planted with infected tubers at Federal Point in the Hastings section of Florida, but it was not at all general in the region. On April 24 the disease was reported as severe in one field of frost-injured potatoes in Arizona.

More recently the disease has been reported from New York (June 23), where field inspectors found from 1 to 3% in several plantings on Long Island, and from Tennessee by C. D. Sherbakoff, whose statement is quoted:

> "At Fishery I examined some fields of Irish potatoes and found the following:
>
> "Blackleg is worse than I ever thought it could be. In one field, about 2 acres, planted with Maine 'certified' potatoes of Spaulding Rose No. 4 variety, it is responsible in my estimation for destruction of at least 70% of the plants. I pulled out a considerable number of the affected plants and found blackleg alone and very severe in every case, so there is no doubt as to the cause of the damage. Next to these potatoes were Irish Cobblers not 'certified'. Blackleg there was about 4%. Practically none of it was found in the third field (Green Mountain)." (June 3).

HOPPERBURN NOTICED IN LOUISIANA FOR THE FIRST TIME

C. W. Edgerton reports (June 27) that typical hopperburn was observed for the first time in central and southern Louisiana, where it caused considerable loss. It appeared first at Hammond, on April 25, and was most injurious during April and May. Edgerton says:

> "This is the first time the trouble has been noticed in Louisiana. It caused some loss in some localities but fortunately did not start until the end of the season. In some fields the loss was as high as 10%. Leafhoppers were abundant."

Tipburn is said to be fairly common in Nassau County, New York. (H. C. Odell, June 12).

ROSE BUSHES IN RELATION TO POTATO MOSAIC

The attention of collaborators is called to a recent bulletin by Miss Edith M. Patch of the Maine Experiment Station[1] in which the importance of rose bushes to the potato mosaic and leaf roll problem in the northern states is clearly shown. The author states (pp. 340-342):

> "It is the belief of the writer founded on nearly twenty years collecting acquaintance with the pink and green aphid that this insect in Maine has but one primary host on which it normally overwinters - the rose. The most scrupulous quest for spring forms of this species on vegetation other than the rose was continued this spring during the entire time that this aphid was active on the rose. It was not taken on anything except rose until after the migration season had begun.
>
> "While it would be a rash thing to offer the pledge 'no rose bushes - no aphids', this bulletin would be without a point if it were not backed by the faith that the destruction of the primary host (the rose) of the pink and green aphid would cause the collapse of that species at least to the extent that it could no longer function as it does now (by virtue of its numbers and fairly constant occurrence), as probably the most serious carrier of potato mosaic. The writer knows of no case in the north where any species of aphid attains the economic status of a serious pest in the absence of its normal primary host. In the south it is possible for many species to maintain themselves by virtue of a continuous viviparous reproduction and the overwintering eggs play a less important role than in a cold climate where they are a necessary link in the annual cycle.
>
> "In the judgment of the writer and certain plant pathologists who have been watching the mosaic situation with reference to aphid infestation, there seems to be no guarantee for healthy potatoes in the vicinity of rose bushes. We know, from experimental evidence previously recorded that aphids can and do carry potato mosaic and leafroll; we believe, from a series of apparently convincing circumstantial evidence, that the pink and green potato aphid is the insect most concerned with the field transference of potato mosaic in northern

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1. Patch, Edith M. Rose bushes in relation to potato culture. Maine Agr. Exp. Sta. Bul. 303: 321-344. Fig. 50. Dec. 1921.

Maine and northern New Brunswick; and we think that such evidence is of sufficient importance to warrant the recommendation that rose bushes, in the vicinity of commercial potato fields, especially where certified stock is grown, should be removed or annually de-aphidized.

"On the other hand while stressing the rose bush and the aphid, we are not to be interpreted as claiming that, in the elimination of the pink and green aphid, the problem of mosaic control has been solved. The possibility that certain other potato insects may be able to carry diseases should not be overlooked.

"But, the fact that there may be other insects guilty to a less extent of the same offense is obviously no argument against a campaign directed toward this aphid. That is, the possibility that a complete elimination of the spread of mosaic may not be attained is no reason for neglecting measures that promise to reduce such spread greatly."

In view of this important work, collaborators are asked to make observations as they have opportunity, on the relation between aphid-infested potato fields and rose bushes, and to determine whether there is any apparent connection between the severity and earliness of infestation of potato plants and their distance from roses.

TOBACCO

WILDFIRE CAUSED BY BACTERIUM TABACUM

Wildfire has been reported as occurring in seed beds in Connecticut, Pennsylvania, Maryland, and Kentucky. In Connecticut, due to control measures used and to weather conditions less favorable to infection, and in Kentucky, the disease is not so important as last year. In Maryland, however, wildfire is said by Temple and Jehle to be severe in parts of Prince Georges County, and in Pennsylvania Thurston reports: "Wildfire has broken out again in Lancaster County. Extent at present unknown, though its presence has been reported in several seed beds."

ANGULAR-SPOT CAUSED BY BACTERIUM ANGULATUM

Valleau reports angular-spot as widely distributed in Kentucky, but causing slight injury thus far. It seems to be less prevalent than in 1921.

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